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Population Change as Related to Long-Term Cycles in Residential Construction in the United States

ABSTRACT

Major demographic changes have occurred in the United States that will significantly affect the future demand for housing and economic growth here. Net household formation is now at a peak because of the "baby boom" of the last generation. New housing demand and the demand for additional jobs have been extremely strong because of the large numbers of young adults now crowding into the labor and housing markets.

The current situation will continue into the 1980's; however, by 1990 the situation will reverse as the impact of declining birth rates of the last 10 years is felt. The number of young adults 18 to 24 years of age will decline substantially by 1990. Middle-aged households, in turn, will grow rapidly in numbers. Thus, the housing and labor markets will be quite different from what they are now.

This paper analyzes the potential impact of changing population growth rates and the age structure of the population on potential housing demands for three alternative assumptions of population and economic growth.

Population Change as Related to Long-Term Cycles in Residential Construction in the United States[2]

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INTRODUCTION

Between 1947 and 1966 the United States experienced a sustained rate of growth in real Gross National Product (GNP) of 4 percent with little inflation and mild economic recessions. Many economists in the U.S. had begun to believe that economic cycles could be controlled by fine-tuning fiscal and monetary policy and that a sustained rate of GNP growth of 4 percent with moderate inflation and unemployment could be maintained indefinitely. Events of the 1970's have disproven this view and have led to doubt and uncertainty about future economic stability. In addition a renewed interest in the study of economic cycles has developed. One area of particular significance to economic growth at the present time is the relationship of demographic change to household formation and residential construction activity.

This paper is particularly concerned with demographic changes now occurring in the United States and their impact on future housing construction. The close relationship of past cycles in residential construction and economic activity in the

United States indicates the importance of the study of demographic change and residential building *(1).*[3]

Projections of household formations and housing demand are considered in this paper for their effects on long-term economic and population growth. Location and the type of housing unit demanded is discussed relative to declining population growth and changing population age structure.

DEMOGRAPHIC CHANGE

In the 1970's the U.S. experienced a period of demographic transition which will significantly affect future demands for many goods and services— ranging from housing to general economic growth, resource requirements, and even societal attitudes. The U.S. traditionally has had a young and growing population. Except for a period during the Great Depression of the 1930's, continued population growth has been taken for granted.

Since the mid-1960's a profound change has taken place in attitudes about population growth, family structure, and the status of women in

society. Women no longer expect to be only housewives and mothers. Careers for women are more and more taking precedence over having children.

Social programs have taken over many of the functions and responsibilities of families and the role of the traditional family in society has waned. Drastic changes in the age structure of the population cause major imbalances in the demand and supply of age-related services such as education. Finally, continued migration to the South and West in the U.S., combined with a dramatic urban-to-rural migration pattern in the last 10 years, has created major problems of urban decline in the large cities of the northern U.S.

For analysis and discussion, demographic change is grouped into the following categories: (1) population growth, (2) changes in population age structure, (3) household and family structure, and (4) internal migration

The implications of these changes on current and future trends for housing demand and economic growth are discussed.

Population Growth

Population growth is determined by changes in birth and fertility rates, mortality rates, and net migration. In the 20th century substantial changes have occurred in all three of these components of growth. Of particular importance in the long run is the fertility rate (the number of children a woman has on complet on of childbearing).

Total population growth in the U.S. has slowed from a high of 1.8 percent in 1957 to 0.8 percent in 1978. A low of 0.7 percent in 1976 matched the previous low growth rate during the Great Depression of the 1930's. If current low fertility rates continue, total population growth will stop in the next century.

Historically, population growth has had a number of long-term swings. Prior to the mid-1920's, immigration to the U.S. responded positively to favorable economic conditions and a number of long-term cycles of population and residential building have been identified (2). Since immigration was restricted in 1925, the patterns of population growth have changed. Birth rate, rather than immigration, is primarily responsible for cycles of population change. According to a theoretic formulation by Easterlin (3), children are demanded not because of labor scarcity but rather as a consumer good. Young families attempt to maintain standards of consumption, and their fertility declines when the family incomes are low relative to other families. According to this argument, the current low fertility rates are caused by the relatively poor job prospects for the large numbers of young adults now crowding the labor markets; accordingly, that fertility will rise in the future when there are relatively fewer young workers.

Fertility

Fertility and birth rates declined fairly steadily from 1800 to the 1930's. Then just as demographers were concerned that the level of fertility would fall below the level required for replacement of the population—about 2.1 children per woman—couples began increasing their rate of childbearing. By the late 1950's t' e fertility rate reached a level of 3.7 This observation in the history of American fertility came to be called the "baby boom."

Since 1963 the fertility rate declined rapidly until it reached the low of 1.8 in 1976. Recent birth expectations by young American women indicate that two children is now the desired family size (13). The future course of fertility in the U.S. is subject to much debate among demographers. Some agree that more favorable economic conditions for younger workers in the next two decades will cause fertility to rise. Others contend that fertility rates will be permanently lowered because of changed social attitudes toward women and family and the near universal availability of birth control and abortion. However, the most likely path is a return to fertility rates near the level of 2.1 children per woman which would sustain the current population level without immigration.

Current projections by the U.S. Census Bureau (16), show that, even at this moderate fertility rate, births per year will rise to 4 million by the mid-1980's because of the large number of baby-boom children now reaching childbearing age. Alternative fertility rates considered by the Census Bureau were: Series I -2.7, Series II -2.1, and Series III -1.7. If the fertility rate should rise to 2.7, total births would reach 5 million by the late 1980's.

Mortality Rate

The second basic determinant of population growth is the mortality rate. Overall the mortality rate in the United States declined from 17 per 1,000 in 1900 to 9 per 1,000 in 1977. In the 1970's, age-specific death rates in middle and older age groups have shown renewed declines after generally stabilizing in the 1960's. Further, research indicates future moderate decreases are likely in these rates (22). In the Census Bureau projections, the average life expectancy at birth for males was assumed to be 71.8 years and 81.0 years for females. This compares with an overall life expectancy of 47 years in 1900 and 70 years in 1970 for both sexes.

Immigration

Immigration is the third major factor associated with population growth. Since the 1920's, immigration has been restricted in the U.S. Generally net immigration has been an important factor in population growth in the U.S. except for the 1930's when slightly more people left the country than entered.

In the 1970's net immigration averaged about 350,000 persons annually or about 25 percent of net population growth. In addition a substantial number of illegal immigrants also enter the country and contribute to population growth. Eventually the question of immigration, legal and illegal, will become increasingly important in determining the U.S. population growth. Net immigration is assumed to be 400,000 persons annually for projection purposes by the U.S. Census Bureau.

Changing Age Structure

Three major trends in the annual number of births during the past 50 years have shaped our present unbalanced age structure of the U.S. population: (1) a decline in births from 3 million in 1925 to 2.3 million in 1933; (2) the baby boom of the 1940's and 1950's which peaked at 4.3 million births annually during 1957 to 1961; and (3) the sharpest decline in the birth rate in our history following this peak of the late 1950's. For 1973 to 1976, births fell to an average of 3.1 million, the lowest level since the end of World War II. However, births rebounded to 3.3 million in 1978 and further increase is likely in the next 10 years as baby boom children reach adulthood.

Age groups will vary widely through time because of these past fluctuations. Population growth now is largely concentrated in the 15 to 35 age group—that is, persons born in the baby boom of 1945 to 1963. There are relatively fewer people in age groups representing persons born during the 1930's and after 1965. As those in today's 15 to 35 age group get older, rapid shifts will occur in population growth by age group. For example, the number of persons 30 to 44 years old will increase rapidly from 1980 to 1990, while there will be substantially fewer persons 10 to 24 years of age than in the preceding decade. This is

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just the reverse of what the growth rates were during the 1950's and 1960's.

These changes in the population age structure will have an important effect on the demands of our society. In the next 50 years, the concerns of youth will be replaced by those of the middle-aged, and finally of the elderly. The needs of society—housing, social services, education, and recreation facilities—will change as the baby-boom children grow older.

The 1960's brought the era of the youth cult as the baby-boom generation reached adolescence. The needs and wants of this group were skillfully exploited by mass media advertisers. For example, the youth-look was fashionable in dress for older people. Organized sports boomed, and the demand for many types of outdoor recreation opportunities increased.

The current era is of the young adult and will last to 1985. Generally, they are concerned with getting jobs, establishing homes, marrying, and having a family. They acquire homes, furniture, appliances, and cars. Usually they go into debt to purchase these items. This places added strain on capital markets at a time when there are relatively fewer middle-age savers 35 to 54 years old. Meanwhile, fewer babies in the last 10 years will be reflected by a relative reduction in demands for goods and services catering to young children.

The mid-1980's will usher in the era of younger middle-aged people who typically are not savers and have increasing amounts of discretionary income. Strains on the capital markets should ease. Those having small families especially should have increased incomes to upgrade their standard of living. Demands should remain strong for single-family houses, expensive household goods, cars, boats, recreation vehicles, travel, and the like. At some time, demands may decrease for youth and young adult items—apartments, motorcycles, high school and college facilities—because of the sharp decline in births since the early 1960's.

By the year 2000, older middle-aged people (45 to 64) will begin to dominate our society. As the children of the baby boom begin to reach retirement in 2010, the demand for health services, leisure-time activities, vacation retreats, and luxury goods for this segment of society should expand. There will be a general need for facilities and services for the elderly—retirement homes, nursing homes, and medical and social services.

Changing Household and Family Structure

Since 1950, the number of households in the U.S. has risen about 30 percent faster than population increases alone would have warranted. The trend has been toward smaller families as young adults and older people formed separate households. Consequently, the number of households headed by individuals (widows, divorcees, and other single persons) has doubled since 1960 (19). In 1979, nearly 20 million of more than 77 million households were headed by one individual. The size of the average household dropped from 3.3 persons in 1960 to 2.8 persons in 1979 (10).

Large families of the 1950's and 1960's are gradually breaking up. New, smaller families in which women have a more active role are taking their place. A recent survey of women found that 96 percent see marriage as the preferred life style, but more than half want to combine marriage, children, and careers. This will lead to more women in the labor force. As new generations of families emerge, social needs and structures are likely to be very different from those of their parents. The family is likely to be together fewer years. Couples are likely to have more times without children in their young adulthood and older middle-aged years; thus, the amount of time their activities are restricted by young children will be reduced.

Internal Migration

The United States has always been a nation of people on the move. Traditionally migration has been from the East to the West. More recently, particularly with the advent of central air-conditioning, there has also been a noticeable net migration from the North to the South. In addition, there has, until recently, been a movement from the interior to the coastal areas. For example, the West's percentage of the total population rose steadily from 5.4 percent in 1900 to 17.1 percent in 1970, while the Northeast fell from 27.7 percent to 24.1 percent, and the North Central region from 34.6 to 27.8 percent in the same period. The South's share of total population fell from 32.2 percent in 1900 to 30.8 percent in 1930 and then rose to 31.6 percent in 1940 before falling again to 30.8 percent in 1960. In 1970 it rose slightly to 30.9 percent and in the 1970's has risen more dramatically to about 32 percent in 1977 as part of the much-publicized move to the Sunbelt.

An important unit of measure for urbanization is the Standard Metropolitan Statistical Area (SMSA) which consists of a central city or cities of at least 50,000 inhabitants and the contiguous area whose people are related to the city in communication, services, transportation, and employment. The unit of area used is the county which the central city is in or near. As such they also include some rural areas. As population grows new areas are added to SMSA definitions. The dominant geographic fact in the U.S. from 1900 to 1970 has been the concentration of population in metropolitan areas. From 1900 to 1970 metropolitan counties absorbed about 80 percent of the population increase in the United States. In 1970, 68.7 percent of the population lived in the SMSA's.

This dispersion of population within SMSA's is another noteworthy trend which has occurred since the 1940's. This movement is well known as suburbanization and was particularly strong during the 1950's and 1960's. The percentage of total population in central cities of SMSA's increased from 1900 to 1930 and declined thereafter. The percentage in metropolitan areas, but outside central cities, increased consistently from 1900 to 1970—an increase from 15.9 percent in 1900 to 34.0 percent in 1970 using the 1960 SMSA's definition and to 37.3 percent using 1970 SMSA's. A complete detailed discussion of these changes in the population distribution is presented by Taueber (1973).

In the 1970's a new trend developed, of migration from large metropolitan areas to small cities and rural areas. From 1970 to 1977 central cities continued to lose population, with an emigration over 10 million (12,17) Suburbs as represented by county areas in SMSA's outside of

central cities continued to receive some net immigration from 1970 to 1975. But for 1975 to 1977 they had a net emigration of 2.7 million. Conversely, nonmetropolitan areas had a net immigration of 1.6 million from 1970 to 1975 and 6 million from 1975 to 1977. This dispersal of population in the U.S. is caused in part by changes in the transportation and communication systems of the country and is not likely to be reversed in the near future even with government programs to aid large urban areas.

ECONOMIC GROWTH

In assessing past and prospective economic growth it is useful to separate growth caused by demographic change from other factors. The rate of growth of the GNP is the sum of the rate of growth of population and the rate of growth of output per capita. The growth rate of output per capita is the sum of the growth rate of output per manhour, or productivity, and the rate of change of manhours per capita. In turn, manhours is the product of employment times hours worked. Employment per capita is determined by age-sex specific labor participation rates.

The real GNP of the U.S. grew by 4.0 percent annually from 1947 to 1966 and 3.3 percent from 1966 to 1973. Output per capita grew by 2.3 percent annually in both periods. However, output per employee, or productivity, fell from 2.6 during the 1947 to 1966 period to 1.4 percent between 1966 and 1973. From 1973 to 1979 real GNP grew by only 2.5 percent annually, GNP per capita grew by only 1.7 percent, and productivity growth declined to less than 1.0 percent. Even after allowing for the shock effect of the disruption caused by the large increase in oil prices, productivity increase appears to be following the lower trend established since 1966.

Three assumptions about economic growth are used here: (1) an optimistic series assuming that real GNP growth per capita will grow at about its trend rate from 1947 to 1973 of 2.3 percent annually, (2) a medium series assuming that growth in real GNP output per employee and per capita will slow to the trend established for 1966-1979—about 1.3 percent annually, and (3) a low series assuming little growth in real output per capita. Under this assumption

personal disposable income per adult after inflation is assumed to remain constant. This alternative provides an alternative to measure population change.

The three U.S. Census Bureau's population projects previously mentioned are combined with the three alternative prospects of economic growth to produce a range of alternative projections:

High Projection—Optimistic economic growth and Population Series I.

Medium Projection—Moderate economic growth and Population Series II.

Low Projection—Low economic growth or constant income and Population Series III.

While other combinations of economic and population assumptions are possible, these three provide the widest range of projections. In addition, fertility is at least partially related to economic conditions (3).

Method of Projection

The projections presented in this paper were made using a comprehensive computer model for projecting housing demand by type of unit and region in the U.S. (7,9). The model is demographically based upon estimates or projections of population by age group and the regional distribution of population. Basic economic assumptions are added to develop projections of households and housing demand by type of unit and region.

In the model basic housing demand is created by: (1) additional household formations, (2) replacement of housing units destroyed or retired from the housing inventory, and (3) an inventory of vacant units for sale or rent, or held for such purposes as second homes. Each of these components of demand is estimated separately in the model.

The model consists of two major sectors: (1) the demographic sector which calculates the effects of the household life cycle on household formations and type of housing demanded and (2) the regional housing sector which estimates overall housing demand by region.

The demographic sector begins with the estimations of household formation based upon estimates of

population by age group. In projecting future household formations, it is useful to separate movements caused by population changes and those caused by changes in the rate of occurrence for a given population age group.

The effect of population change on household formation s separated from other factors by defining headship (H^i) as the proportion of a given population (Pop^i) for age i that heads households (HH^i)$_i$ of

$$H^i = \frac{HH^i}{Pop^i}$$

The total number of households is then determined by estimating the level of headship and the future population by age class separately. Seven age classes are used in our model. They are: 18-24, 25-29, 30-34, 35-44, 45-54, 55-64, and 65 years and older. Virtually all household heads are over 18 years (over 99.9 pct) and are likely to remain so. Census Bureau population projections are available by age class for alternative fertility, mortality, and immigration assumptions and can be used with this model.

Headship rates have increased for all age groups since 1950. A major factor in this increase has been the steady rise in real per capita personal income in the same period. Specific behavioral relationships have been formulated relating headship to income.

The second part of the demographic model determines the type of housing demand. The types of housing units are distinguished in the model: (1) single-family houses—attached and detached, (2) multiunit structures, and (3) mobile home units. The proportion of household heads who live in each type, or the occupancy rate, is estimated for each age group. The effects of changes caused by population is separated by use of these rates. Projections of future changes in occupancy rates are made using estimates of change in household type and size, region of the country, metropolitan location, and income.

Estimates of the regional distribution of population among the four major census regions of the United States are also included in the demographic sectors. The four regions are the Northeast, the North

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Year	Total households	Average annual household increase[1]		Persons per household
	Million	Thousand	Pct	No.
1920	24.4	430	2.1	4.3
1930	30.0	560	2.1	4.1
1940	35.0	500	1.5	3.8
1950	42.0	800	2.1	3.5
1960	53.0	1,000	2.1	3.4
1970	63.4	1,040	1.8	3.2
1979	77.3	1,550	47.0	2.8
LOW PROJECTIONS				
1990	91.3	1,270	1.7	2.6
2000	98.5	720	.8	2.5
2010	104.9	640	.7	2.4
2020	112.1	720	.7	2.3
2030	116.3	420	.4	2.1
MEDIUM PROJECTIONS				
1990	93.5	1,470	1.9	2.6
2000	102.9	940	1.0	2.5
2010	112.8	990	1.0	2.4
2020	122.0	920	.8	2.4
2030	128.2	620	.5	2.3
HIGH PROJECTIONS				
1990	94.7	1,580	2.1	2.7
2000	105.8	1,110	1.2	2.7
2010	119.5	1,370	1.3	2.6
2020	129.5	1,000	.8	2.7
2030	138.2	870	.7	2.8

[1] Source. 1920 to 1970: U.S. Forest Service (11). Table 115; 1977: U.S. Census Bureau (20). Note: Historical data on households are for decennial census dates, generally April 1. Projected number of households are estimates of July 1 of given year
[2] Average annual increase for preceding decade.

Central, the South, and the West. These estimates of regional population are then used to distribute households and housing types by region (8). Adjustments are made for variations in household size and distribution of housing types by region.

The second major sector of the model is the regional housing demand model. Regional replacement and vacancy rates are estimated based upon external analysis. The total housing inventory by regions is calculated from the number of household and vacancy rates. Net replacement rates are used to estimate replacement demand. Total housing demand is then calculated by adding the components of new household formation, replacement. and additional vacancy units including second homes. The mix of housing types demand is calculated using parameters from the demographic sector of the model.

Household Formations

Net household formations are the most important source of housing demands. Prior to the 1950's most housing demands resulted from an increase in households. Although considerable fluctuation has occurred over the years, net annual average household formations have increased from about 430.000 for the decade of the 1910's to about 1 million in the 1950's and 1960's and then increased to over 1.5 million in the 1970's (table 1).

Household formations depend upon change in the size and age structure of the population and number of individuals willing and able to occupy separate housing units. The latter is determined largely by the level of personal income and social change as expressed by headship rates. i.e., the proportion of the population in each group who head separate households.

There is a well-defined relationship between age and headship. Headship rates rise sharply between age 20 and 30 until about 50 percent of all persons head their own household. usually as a married couple. Headship then rises slowly with age as families dissolve until about 64 percent of all people over 65 are household heads.

Between 1940 and 1979, headship rates have increased for all age groups. However, headship rates will reach a saturation level where all couples and individuals who want their own households have them. This analysis indicates that this limit will likely be approached in the next 10 years if economic growth continues at past levels. For example, headship rates for the 55- to 64-year-old group have ranged about 58 percent and have not increased for the past 11 years. Thus this group may be already reaching its upper limit. Headship for those over 65 years of age reached a high of 65 percent in 1976 before falling to 63.7 percent in 1977 (the level it was in 1972). This suggests that this age group may also be approaching its upper limit. It is even argued that headship rates will decline in the future (4). While this is not likely. it certainly is in the range of possibility. Regardless of exactly when headship reaches its saturation point. the outcome is clear. Population change will become increasingly important in determining household formation as the period of rising headship since 1947 ends.

In the projections presented in this paper an upper limit for headship was calculated based upon estimates of the number of married couples by age group and a maximum headship rate of 80 percent for unmarried people. An allowance was made for a possible future 10 percent decline in married people. The same upper limits were used for the medium and high series while the low series assumed headship rates would remain at their projected 1980 level (table 2).

Projected net household formations based upon headship and census population projections continue at high levels until the early 1980's and then decline through the rest of the 1980's and early 1990's. After 1995 alternative assumptions about fertility become important in determining timing and magnitude of an increase in future households. Net household formations are projected to decline
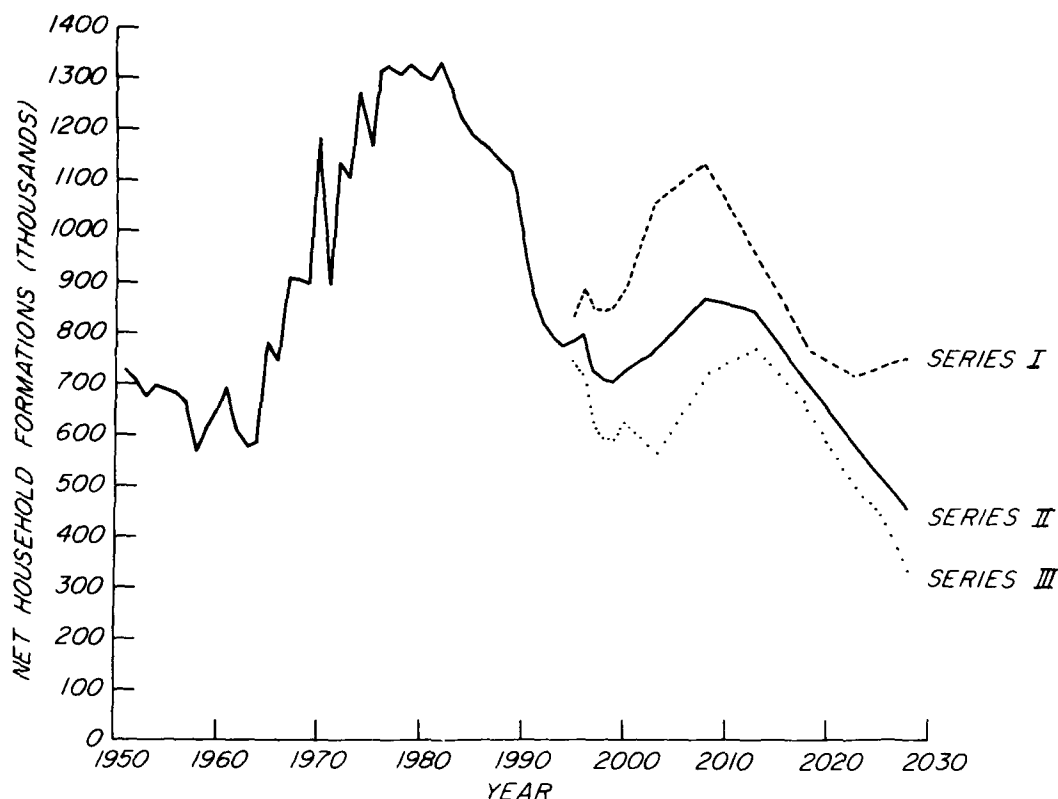
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Figure 1.—The impact of changes in the size and age structure of the population on net household formations 1950 to 1979 with projections to 2030 for the three Census Bureau population projections.

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from 1.3 and 1.5 million in the 1980's to between 400,000 and 900,000 in the decade of the 2020's.

The average size of households is also expected to continue to fall. It decreased from 4.3 persons in 1920 to 2.8 in 1979 and it is projected to fall to 2.3 in 2020 for the medium projection (table 1).

Impact of Population Change

Population change alone is a major determinant of household formation and housing demand. Its impact on net household formation from 1950 to 2030 is assessed by assuming constant headship rates by age class at projected levels for 1980. Under this assumption only population by age group and the regional distribution of populations change. Alternative projections are presented for the three population projection series by the U.S. Census Bureau.

Under these assumptions, net household formations required by population change alone were about 650,000 annually from 1955 to 1964. The required household formations rose from 800,000 in 1965 to over 1.3 million in 1976, as the impact of the baby-boom generation peaked (fig. 1). A high level of household formation because of population change continues into the early 1980's before declining to 782,000 by 1995. After 1995 alternative assumptions about fertility begin to impact the level of household formations required because of changes in population size and age structure.

The medium series (II) continues to decline to a low of about 700,000 household formations by the year 2000, then rebounds to 870,000 from 2006 to 2010, before falling again to 460,000 between 2025 and 2030.

Series I, which assumes a return to higher fertility levels, follows a similar pattern; however, it reaches a low of 770,000 household formations in 1994 and then increases to a peak of 1.1 million in 2000 to 2010 as sort of an echo of the baby boom, with a decline to about 750,000 after 2020.

Series III assumes a drop in fertility resulting in negative population growth by 2020. For this series, total household formations drop to 750,000 in 1995 and then continue to fall to under 600,000 around the year 2000 before rebounding to about 770,000 from 2010 to 2015, and then falling sharply to 330,000 by 2030.

The most important feature of this demographic analysis is that the U.S. is now at an all-time peak of household formations caused by population change. Even under optimistic assumptions about future birth rates, this peak will not be surpassed in the next 50 years. Because of recent low birth rates, net household formations may fall by nearly half by the 1990's.

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Table 2.—Headship rates[1] by age class, 1940 to 1977,[2] with projections to 2030

Year	Age class						
	18-24	25-29	30-34	35-44	45-54	55-64	65 and over
				Pct			
1940	8.2	28.2	37.7	44.6	50.7	54.0	56.8
1950	13.1	33.9	39.9	44.8	49.2	52.0	52.8
1960	15.8	39.3	44.9	48.0	53.0	54 7	56.8
1970	17.6	44.5	48.8	50.7	52.7	58.3	62.9
1977	21.2	47.3	52.1	53.6	55.0	58 1	63.7
1978	21.4	47.9	52.3	53.8	54.2	59.2	63.8
LOW PROJECTIONS							
1980	21.3	48.0	52.4	53.9	54.9	58.5	64.6
1990	21.3	48 0	52.4	53.9	54.9	58.5	64.6
2000	21.3	48.0	52.4	53.9	54.9	58.5	64.6
2010	21.3	'8.0	52.4	53.9	54.9	58 5	64.6
2020	21.3	o.0	52.4	53.9	54.9	58 5	64 6
2030		48.0	52.4	53.9	54.9	58.5	64.6
MEDIUM PROJECTIONS							
1980	21.3	48.0	52.4	53.9	54.9	58.5	64.6
1990	23.3	51.6	54.4	55.0	55.8	59.5	66.5
2000	25.4	54.2	55.8	56.0	56.6	60	67.4
2010	27.2	55.7	56.6	56.6	57.2	60.6	67.8
2020	28.5	56.5	56.9	56.9	57.6	60.8	68.0
2030	29.3	56.9	57.0	57.0	57.8	60.9	68.0
HIGH PROJECTIONS							
1980	21.4	48.2	52.5	53.9	54.9	58.6	64.7
1990	23.8	52.5	54.8	55.1	56.0	59.7	66.8
2000	26.4	55.1	56.3	56.2	57.0	60.4	67.7
2010	28.2	56.4	56.8	56.8	57.5	60.8	67.9
2020	29.2	56.8	57.0	57.0	57.8	60.9	68.0
2030	29.7	57.0	57.0	57.0	57.9	61.0	68.0

[1] Headship rate is the percentage of persons in each age class that heads a household.
[2] Source: 1940 to 1970: Marcin (7); 1977 and 1978: Author's estimate based upon U.S. Census Bureau (14,15).

Total Housing Demand

Projections of housing demand for the U.S. are summarized by source of demand—household formations, vacancies including second homes, and replacements. Total new housing productions averaged about 800,000 units annually in the 1920's and 1940 with only an average of 365,000 units produced in the 1930's (table 3). Most of this production was used to satisf additional households. Vacancies 240.000 annually in the 1920's and remained virtually unchanged for the 1930's and 1940's. Net replacement demand was small prior to the 1950's. Conversion of existing structures and unreported building offset the normal losses of units from fire and other natural disasters. In fact, in the 1930's and 1940's net replacement was actually negative because of the large number of conversions of existing houses into apartments.

In the 1950's housing production rose to over 1.5 million units annually. Household formations averaged about 1 million a year while vacancy and replacement demands averaged 228,000 and 267,000 units a year. In the 1960's total housing production averaged about 1.6 million units annually with net replacement averaging nearly 600,000 units a year.

In the 1970's, housing production fluctuated widely—rising to nearly 3 million units in 1972, plunging to 1.4 million units in 1975, and then rebounding to 2.3 million units in 1977. The average for the decade so far has been over 2.1 million units. Household formations grew at over 1.5 million a year while net replacement fell to about 415,000 units (18).

Total housing demand is projected to continue at a high level in the 1980's with the lowest projection averaging 2.1 million units annually and the highest at 2.6 million. In the 1990's housing demand could fall as low as 1.6 million units annually.

After the year 2000 housing demands will increasingly depend upon future levels of population growth. Total demand is projected to range from a possible annual average as high as 2.7 million units to as low as 1.5 million units.

In the 1990's and beyond, more housing demand is projected for replacements and vacancies (including second homes) than net household formations as the impact of declining population growth occurs (fig. 2). These relatively high levels of replacement demand are based upon the assumption that economic conditions will favor new construction and that changing energy standards and dispersal of population will lead to replacement of older energy-inefficient housing units and unfavorably located units. However, lower levels of replacement demands are possible because net replacement can be easily postponed by un-

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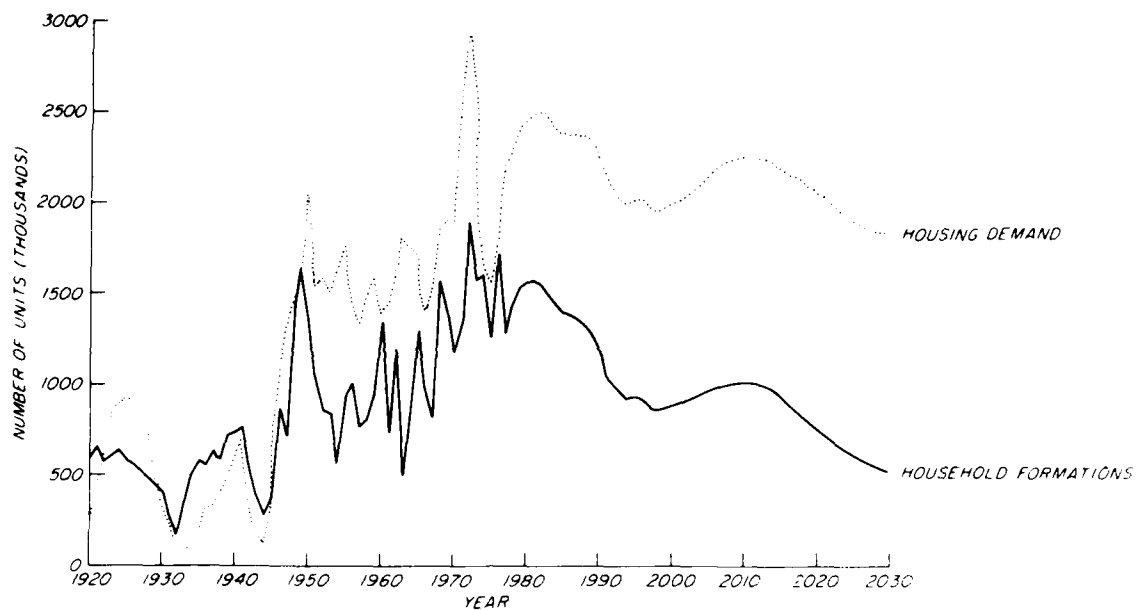
Figure 2.—Demand for new housing and net household formations 1920 to 1979 with projections (medium level)
to 2030.

(M 146 415)

THE MIX OF NEW HOUSING PRODUCTION
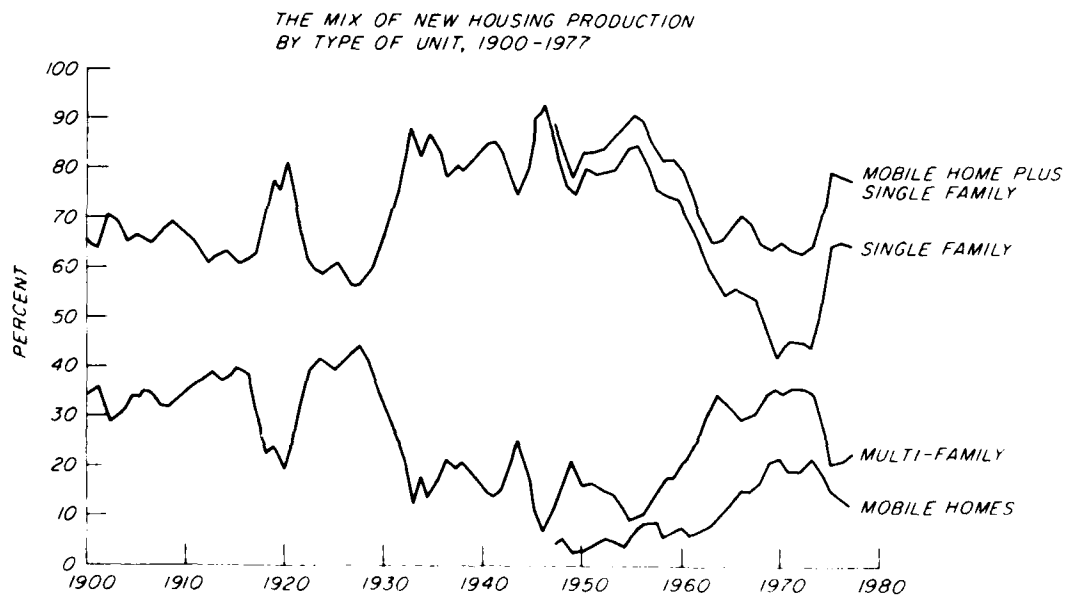BY TYPE OF UNIT, 1900-1977

Figure 3.—The mix of new housing production by type of unit, 1900 to 1979.

(M 146 409)

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Table 3.—Average annual demand for housing in the United States, by source of demand, 1920 to 1977,[1] with projections to 2030

Period	Total demand	Household formations	Vacancies Conventional units	Net replacements Total	Net replacements Conventional units	Net replacements Mobiles used as primary residences	Mobiles not used as primary residences
				Thousand units			
1920-29	803	556	239	8	—	—	—
1930-39	365	496	-23	-108	—	—	—
1940-49	809	801	80	-72	—	—	—
1950-59	1,522	1,005	228	267	—	—	22
1960-69	1,649	1,039	-23	591	—	—	41
1970-79	2,146	1,550	120	403	—	—	73
LOW PROJECTIONS							
1980-89	2,086	1,214	115	698	533	165	59
1990-99	1,645	752	71	773	605	168	49
2000-09	1,567	641	61	814	652	162	51
2010-19	1,707	726	69	859	701	158	53
2020-29	1,424	445	42	892	743	149	45
MEDIUM PROJECTIONS							
1980-89	2,498	1,508	160	762	581	181	68
1990-99	2,149	1,040	122	926	733	193	61
2000-09	2,227	1,023	125	1,010	815	196	68
2010-19	2,219	934	121	1,097	897	200	67
2020-29	1,925	621	93	1,151	959	192	60
HIGH PROJECTIONS							
1980-89	2,604	1,569	188	775	583	192	72
1990-99	2,335	1,125	157	986	779	207	67
2000-09	2,715	1,344	170	1,120	898	222	81
2010-19	2,508	1,049	143	1,238	1,005	233	78
2020-29	2,385	869	128	1,312	1,083	229	76

[1] Source: 1920-29 to 1960-69: U.S. Forest Service (11), Table 1:9; 1970-79: Author's estimate based on U.S. Bureau of Census data (20).

favorable economic conditions such as occurred in the l930's. Thus, total housing demand could fall below these projections if conversion and preservation of existing structures should lower net replacement rates.

Demand for Housing by Type of Unit

From 1900 to 1977 approximately 70 percent of all housing units produced were single-family houses. There have, however, been several major cycles in the relative importance of each type (fig. 3). During the 1920's and from 1960 to 1973, major booms in apartment buildings took place with the multiunit housing market share reaching about 40 percent of total housing production.

Single-family housing generally accounted for between 80 and 90 percent of all housing production from 1930 to 1960. After declining to about 55 percent in the late 1960's and early 1970's, single-family houses increased to 65 percent in 1976 to 1977; when mobile homes are included with conventional units, the share was 77 percent.

In the late 1950's, mobile homes emerged as a significant alternative form of single-family housing. The mobile home share of all housing production rose to a peak of almost 22 percent in 1973. Since then the mobile's market share has fallen to about 12 percent, but the units are now larger and more like houses.

Single-family housing is assumed to dominate housing demands for the projection period from 1980 to 2000 because of the large increase in middle-aged household heads during this period. About 70 to 80 percent of conventional housing starts are projected to be single-family houses, or at least 1.5 million houses a year for the medium projection (table 4).

When mobile homes are included in total housing production, the overall mix of projected types is about 66 percent conventional single-family, 14 percent mobile homes, and 20 percent multifamily housing units. After the year 2000 a moderate recovery in multiunit housing units is projected; that trend's duration and magnitude will depend largely upon the extent of the current rebound in births in the next 15 years.

Age and Family Type

The age of the household head and family type are important determinants of the type of housing occupied. The overwhelming majority of husband-wife households live in single-family houses—overall nearly 80 percent with about 86 percent for household heads 35 to 54 years old. From 1960 to 1976 the percentage of married couples over 30 living in single-family houses increased slightly despite the decline in single-family housing production. Multiunit occupancy declined substantially for couples between 30 and 65 years of

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Table 4.—Average annual production of new housing units in the United States, by type of unit, 1920 to 1979,' w of demand to 2030

Period	Total	Conventional units			Mobiles	
		Total	One-family	Multi-family	Total	Used as primary residences
				Thousand units		
1920-29	803	803	527	266	—	—
1930-39	365	365	305	70	—	—
1940-49	809	780	670	110	29	—
1950-59	1,522	1,460	1,276	184	62	40
1960-69	1,649	1,443	929	514	206	165
1970-79	2,146	1,780	1,144	636	366	293
LOW PROJECTIONS						
1980-89	2.086	1.793	1.382	411	293	234
1990-99	1.645	1.399	1.182	217	246	197
2000-09	1.567	1.313	1.007	306	255	204
2010-19	1.707	1.444	1.069	375	268	210
2020-29	1.424	1.198	878	320	226	181
MEDIUM PROJECTIONS						
1980-89	2.498	2.160	1.624	536	338	270
1990-99	2.149	1.844	1.474	370	305	244
2000-09	2.227	1.889	1.359	530	338	270
2010-19	2.219	1.884	1.353	531	335	268
2020-29	1.925	1.625	1.138	487	300	240
HIGH PROJECTIONS						
1980-89	2.604	2.246	1.681	565	358	286
1990-99	2.335	2.000	1.562	438	335	268
2000-09	2.715	2.308	1.578	730	407	326
2010-19	2.508	2.118	1.481	637	390	312
2020-29	2.385	2.007	1.326	681	378	302

Source: 1920-29 to 1960-69: U.S. Forest Service (11), Table 120; 1970-79: Author's estimate based on U.S. Bureau of Censu

age and remained about the same for those over 65. Mobile home occupancy increased steadily from 1 to about 5 percent for couples in all age groups, with a relatively higher proportion in younger and older groups.

A category called "other" families consists largely of single-parent households. Female heads are by far the most common. In 1976 about 60 percent of this category lived in single-family homes, 36 percent in multifamily structures, and 4 percent in mobile homes. Single-family occupancy increased with age, over 70 percent of those 45 years and older living in single-family houses. Furthermore, this pattern has remained unchanged from 1960 to 1976.

The third and most rapidly increasing category of household is the primary individual (i.e., one-person households and nonrelated individuals living together who maintain separate dwelling units). This group is most likely to live in multiunit structures. However, the predominance of apartment living is not as high as one might expect. For 1970 and 1976, about 50 percent of primary individuals lived in multifamily housing units, about 45 percent lived in single-family houses, and 5 percent in mobile homes. Housing occupancy is age-related for this group. For example, nearly 75 percent of individuals under 30 years of age live in multiunit structures while about 55 percent of those over 55 years of age live in single-family houses.

Characteristics of the type of housing occupied can be outlined as follows:

1. Single-family housing is the dominant housing type for husband-wife households, and has slightly increased its share of the market for households in the over-30 age group since 1960. About 8ɛ percent of all husband-wife households aged 35 to 54 lived in single-family houses in 1976.

2. Multiunit occu creased for younge renters since 1960 evidence that olde ing to apartments large numbers—ne couples over 65 liv homes.

3. Single-family predominant type families in the ove primary individual: group, and there h change in these h since 1960.

4. Mobile home creased for all age to 1975; however, under-30 age grou homes. Household only about an ave mobile homes des large numbers of this type of housi

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5. Patterns of housing choice from 1960 to 1976 have changed little for household heads over 30 years of age when age and family type are considered, despite wide swings in housing production by type of unit.

The mix of household types has changed significantly since 1950. The proportion of households headed by single persons and nonrelated individuals has increased from 11 percent to over 25 percent from 1950 to 1979. Correspondingly the percentage of traditional husband-wife households has fallen from 78 to 64 percent in the same period. Other families now account for 12 percent of all households, up from 11 percent in 1950 but still below the 14 percent level for this category in 1940.

SUMMARY

Major demographic changes are now occurring in the United States which will profoundly affect future housing demand and economic growth. Net household formations are now at an all-time high because of the "baby boom" of the last generation. However, recent low birth levels will likely lead to a substantial decline in the level of household formations and housing demand after 1990. If this decline in demand for housing and the other goods associated with household formations should be reinforced by other negative economic trends such as high energy costs or negative attitudes toward growth by an older middle-aged society, a substantial economic decline could take place. For example, the Hudson Institute (5) has outlined a number of possible economic conditions which could lead to slow or no growth.

The type of housing units demanded and their location are also affected by changing demographic characteristics. Household heads in the middle-aged bracket are more prevalent in suburban and rural locations. Young household heads tend to live in central cities. In the next 20 years, population is likely to continue to disperse to suburban and rural locations as the number of households headed by middle-aged persons increases and the number of young households decreases Smaller families with fewer children at home for shorter periods may improve household mobility. Another likely trend is for household heads to retire earlier and migrate to smaller cities in the South and West.

Major changes in transportation and communication systems also favor dispersal of population. In the last 20 years, a major new transportation system has evolved in the United States based upon interstate highways and large regional airports. This system favors dispersed suburban and rural locations for business at the expense of older central cities. Building cycles are at least in part related to changes in transportation systems (6). The tremendous improvements in telecommunication systems in recent years now make it possible for even remote locations to receive information services at reasonable costs. In addition, people in rural areas, with television as a source of information and entertainment, no longer feel isolated. It has been speculated that telecommunications may affect settlement patterns as profoundly over the next two decades as transportation has done during the past two decades.

Overall demographic trends favor a continued strong housing market in the 1980's, a high level of single-family housing demand, and dispersal of population away from large cities. After the year 2000 rates of fertility become increasingly important in determining housing demand.

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    Major demographic changes have occurred in the U.S.
that will significantly affect future demand for housing
and economic growth. Net household formation is at a
peak now because of the "baby boom" of the last generation.
Current job and housing demands by young adults will con-
tinue for 10 years and then reverse as the impact of the
current declining birth rate is felt. This paper analyzes
the potential effects of population growth rate and age
structure on potential housing demand, based on three
alternate assumptions for population and economic growth.

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